

CLAIMS

1. An ink-jet imaging apparatus having a printing head having plural nozzles for ink ejection, and first ink ejection elements formed respectively near each of the nozzles for ejecting the ink from the nozzle; and forming an image by driving the first ink ejection element to eject the ink, wherein the ink-jet imaging apparatus comprises:

second ink ejection elements formed respectively upstream against the ink ejection direction before the first ink ejection element for ejecting the ink from the nozzles, and

a controller which drives, on prescribed ejection recovery, the first ink ejection elements and the second ink ejection elements simultaneously to eject the ink through the nozzles for ink ejection recovery.

2. An ink-jet imaging apparatus having a printing head having plural nozzles for ink ejection, and plural ink ejection elements formed respectively near each of the nozzles for ejecting the ink from the nozzle; and forming an image by driving any of the ink ejection elements to eject the ink in accordance with image information signals, wherein the ink-jet imaging apparatus comprises:

a controller which drives, on prescribed ejection recovery, two or more of the ink ejection elements simultaneously to eject the ink through the nozzle for ink ejection recovery.

3. ~~The ink-jet imaging apparatus according to claim 1 or 2, wherein the controller functions to change timing of ink ejection of the ink ejection element in correspondence with the shape of the ink liquid face at the outlet of the nozzle.~~

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4. The ink-jet imaging apparatus according to claim 1, wherein the controller is provided with a temperature sensor for detecting the inside temperature of the printing head, and a controller which drives, on prescribed ejection recovery, both of the first ink ejection element and the second ink ejection element simultaneously at prescribed time intervals intermittently in correspondence with the temperature detected by the temperature sensor to eject the ink through the nozzles.

5. The ink-jet imaging apparatus according to claim 4, wherein two or more of the printing heads are provided, and the controller decides the time interval for each of the printing heads in correspondence with properties of the ink to be ejected from the nozzle of each of the printing heads.

6. The ink-jet imaging apparatus according to claim 4 or 5, wherein a memory is provided for memorizing preliminarily the prescribed time interval varying in dependence of the inside temperature of the printing head for each of the inside temperature, and the controller may control both of the first ink ejection element and the second ink ejection element to eject the ink at intervals memorized in the memory based on the inside temperature detected by the temperature sensor.

7. The ink-jet imaging apparatus according to claim 4, 5, or 6, wherein the controller decides the number of times of simultaneous driving of the first ink ejection element and the second ink ejection element based on the temperature detected by the temperature sensor.

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9. The ink-jet imaging apparatus according to claim 6, wherein the memory memorizes the number of times of simultaneous driving of the first ink ejection element and the second ink ejection element, varying with the inside temperature of the printing head, and the controller controls both of the first ink ejection element and the second ink ejection element to eject the ink in the number of times and in the time intervals derived from the memory depending on the inside temperature detected by the temperature sensor.

10. An ink-jet imaging apparatus having a printing head having plural nozzles for ink ejection, and first ink ejection elements formed respectively near each of the nozzles for ejecting the ink from the nozzle; and forming an image by driving the first ink ejection element to eject the ink, wherein the ink-jet imaging apparatus comprises:
second ink ejection elements formed respectively upstream against the ink ejection direction before the first ink ejection element for ejecting the ink from the nozzles, having higher ink-ejection performance than the first ink ejection elements.

11. The ink-jet imaging apparatus according to claim 10, wherein a controller is provided which drives the first ink ejection elements at a

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prescribed first timing, and drives the second ink ejection elements at a second timing later than the first timing.

12. The ink-jet imaging apparatus according to claim 11, wherein a counter is provided for counting the number of times of driving of the first ink ejection elements, and the controller drives the second ink ejection elements when the count of the counter reaches a prescribed number of the times.

13. The ink-jet imaging apparatus according to claim 12, wherein a temperature sensor is provided for detecting the inside temperature of the printing head, and the controller may change the number of times of driving of the second ink ejection element in accordance with the temperature detected by the temperature sensor.

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~~14. The ink-jet imaging apparatus according to any of claims 1 to 13, wherein the above ink ejection element is a heater element which generates heat, or a piezo element which causes a piezo electric effect.~~

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